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Journal of the Neurological Sciences

journal homepage: www.elsevier.com/locate/jns

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WFN15-0079
Stroke 1
Telestroke modena project: Hub and spoke comparison

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Introduction: rtPA thrombolysis still represents the primary therapy in acute stroke. Telestroke is likely the most promising tool to spread advanced care in stroke and to reduce the onset to needle time (ONT). In the last decade thousands of patients have been "telethrombolysed" in Europe, with good results in safety, efficacy and cost effectiveness (1). Following stroke societies' recommendations (2,3), the Telestroke Modena Project aims to offer rtPA therapy in the remote mountain areas, about as far as 1 h from our Stroke Unit.
Methods: The telemedical support consists of a digital network that included a 2-way video conference system, with high speed data transmission that allows stroke neurologists to see the patient and interact with internal physicians at Pavullo Hospital, Modena's Apennines. Brain CT scan is analyzed by a neuroradiologist on duty at Modena Hospital through an integrated RIS–PAC system. The enrollment is provided directly at a patient's home by a rescue team.
Results: From Jan. 2014 to Jan. 2015, 17 patients were included. After a complete evaluation following the standard "on label" criteria 6 patients were selected for "telethrombolysis" treatment with rtPA (5 m and 1 f; mean age: 73 years). We observed a neurological improvement in 5 patients (mean t0 NIH: 6; mean 24 h NIH: 1). 3 month mRS was 0–2 in 66% of patients. Mean onset to door time was 54′, door to needle time 56′ and ONT 123′. The hub results was respectively 64%, 78′, 67′ and 150′.
Conclusion: We found functional outcomes, complication rate and timing results comparable to our Stroke Unit, NINDS and SITS-MOST results.

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doi:10.1016/j.jns.2015.08.324

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WFN15-0889
Stroke 1
The impact of genetic polymorphisms on efficacy of aspirin in ischemic stroke patients in China

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Background & objectives: Little research regarding genotypes and aspirin response related to acute ischemic stroke has been published. This study was conducted to investigate whether the polymorphisms affect aspirin response and prognosis related to acute stroke.
Methods: A total of 752 patients with acute ischemic stroke were enrolled in this study; all received follow-up evaluations 3, 6 and 12 months after aspirin treatment. rs1045642, rs868853, rs1330344, rs20417, rs12041331, and rs2768759 were screened. The arachidonic acid (AA)-induced and adenosine diphosphate-induced (ADP) platelet aggregation test, the National Institutes of Health Stroke Scale (NIHSS), and the modified Rankin Scale (mRS) were used, and blood vascular events were evaluated.
Results: The difference before and after aspirin treatment on AA-induced platelet aggregation was significantly smaller in patients carrying rs12041331G alleles compared with patients carrying none. Patients with none had better outcomes demonstrated by NIHSS and mRS scores after treatment.
Conclusion: rs12041331 genotypes had a significant impact on aspirin response and prognosis of patients with stroke.

doi:10.1016/j.jns.2015.08.325

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WFN15-0890
Stroke 1
Peripheral regulatory T cells and TH17 cells is associated with pathogenesis of MMD patients

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Background: Accumulating evidence has suggested that immune responses may play a pivotal role in the process of Moyamoya disease (MMD).
Objective: The purpose of this study is to explore whether alterations in Treg and Th17 cells in peripheral blood are associated with MMD.
Patients and methods: MMD patients (n = 26) diagnosed by angiography and volunteers (n = 32) were enrolled in this study. To determine the balance of Treg/Th17 in MMD, we used flow cytometry to measure the percentage of Treg and Th17 among lymphocytes in

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peripheral blood. Meanwhile, relevant cytokines were isolated in peripheral blood to evaluate functions of Treg and Th17, respectively.
Results: Cerebral hemorrhage occurs in half of patients as an onset symptom, followed by cerebral ischemia. Our data revealed that both percentage of Treg and Th17 among lymphocytes was elevated in MMD patients. Similarly, MMD patients showed significant increase in functions of Treg and Th17 as evidenced by increased expression of IL-6, IL-10, IL-12, TNF-α, VEGF and TGF-β in peripheral blood. However, no significant difference in the balance of Treg/Th17 was detected between two groups. Furthermore, onset symptoms and gender were independent with these changes.
Conclusion: We first report here increased expression in Treg and Th17 cells that were found in MMD patients, which may provide valuable insight into the immune-related pathology of MMD.

doi:10.1016/j.jns.2015.08.326

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WFN15-0944
Stroke 1
Education of children about stroke and heart attack: Feasibility and effectiveness pilot study

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Background and objective: The effectiveness of stroke educational campaigns aimed at adults is limited. The study objective was to evaluate the feasibility and efficacy of an innovative stroke and heart attack educational program for children.
Methods: The 45 minute multimedia web-based videoprogram was designed to teach the correct response to stroke and heart attack symptoms and to test short-term and long-term retention. Population consisted of school children aged 13–15 from 2 remote counties (target and control) in the Czech Republic. Target population obtained education and testing. Control population had only testing. Ethical committee approved the protocol and children's parents signed informed consent.
Results: All children aged 13–15 participated from 37 schools (8% of all basic schools in the county) as target population ($n = 2436$) during 2014/2015. The control group involved 426 pupils from 6 schools. The baseline knowledge (measured as % of correct response to 12 questions/simulation video-clips) was the same in the target and control population (59% versus 58%). After education, knowledge in the target population improved (67%, paired $p = 0.001$). After 3 months, knowledge was 61% in the target and 53% in the control populations (intergroup difference $p = 0.001$). Knowledge about heart attack was higher than for stroke: at baseline in both target (79% versus 57%) and controls (74% versus 58%) as well as at 3 months (77% versus 57%).
Conclusion: School education on stroke is feasible. Knowledge about stroke is worse than for heart attack. The educational program increased knowledge and response to stroke and heart attack symptoms in the short-term and also long-term.

doi:10.1016/j.jns.2015.08.327

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WFN15-1006
Stroke 1
A national survey of preferences for mobile applications (APPS) among stroke survivors & caregivers

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Background: Mobile technology is underutilized in patient-centered healthcare. Mobile applications (apps) may allow stroke survivors/caregivers to actively participate in stroke-related care/needs.
Objective: Investigate preferences of stroke survivors and caregivers for mobile apps to facilitate post-stroke care/needs.
Subjects & methods: Nationwide survey of 17 questions distributed to 11,720 stroke survivors/caregivers identified from National Stroke Association's database via e-/postal mail, including introduction letter and IRB-approved consent. The survey was developed using formative focus groups in Brooklyn and Colorado. Qualitative information about current smartphone usage/interest in health-related apps was collected. Preferences were explored by gender/race/ethnicity/age/education using χ^2.
Results: 1221 survivors and 396 caregivers responded (14% response). Scheduling doctor/rehab appointments was preferred by survivors and caregivers of all ethnicities, with doctor appointments/medication reminder/blood pressure tracking as most favored by both. App usefulness declined with age ($\chi^2 = 19.7$, $p = 0.02$). App with rehab exercises was more cited by younger survivors with older wanting trustworthy medical information ($\chi^2 = 41.4$, $p < 0.001$). App to find local stroke-related resources was preferred by the majority of caregivers and stroke survivors. More Afro-Caribbean/American survivors (42%) preferred use of stroke support groups vs. Hispanics (36%) or Caucasians (28%), $\chi^2 = 45.1$, $p < 0.001$ as did younger ($\chi^2 = 41.3$, $p < 0.001$). App tracking fitness/diet was more desired by the majority of stroke survivors than caregivers. App facilitating stroke survivors' communication was highly favored by survivors while not considered useful by the majority of caregivers.
Conclusions: Developing relevant apps requires feedback from users. We identified useful key features reported by stroke survivors and caregivers to build a stroke-dedicated app.

doi:10.1016/j.jns.2015.08.328

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WFN15-1024
Stroke 1
Mobile devices for remote acute stroke neuroimaging interpretation: Diagnostic accuracy

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Background: Diagnostic accuracy of various mobile devices for remote acute ischemic stroke CT scan interpretation is not known.

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Objective: Compare diagnostic accuracy of different mobile devices in acute CT interpretation for various ischemic stroke findings among various readers.
Subjects/methods: After IRB approval, 20 selected AIS CTs were independently interpreted by 11 readers (7 neurologists/3 neuroradiologists/1 radiologist) on 2 mobile devices: iPad®2 (1024 × 768 pixels) and iPhone®4 (960 × 640 pixels), and on a Picture Archiving and Communication System (PACS) workstation (1280 × 1024 pixels). Mobile devices used FDA-cleared ResolutionMD software (ResMD® Calgary Scientific, Calgary, Canada). Primary outcome measures: any acute ischemic sign (AIS), any non-acute ischemic sign (NAIS), and hyperdense middle cerebral artery (HMCA) sign. Intra-rater and inter-device accuracy, using a rater specific gold standard, was evaluated; estimated % sensitivity (Sen) and % specificity (Spe) with 95% Agrest–Coull confidence intervals (CIs) were calculated.
Results: Across all 11 readers, for AIS: Sen = 76 (68, 82) and Spe = 75 (64, 83) on iPhone; Sen = 76 (69, 83) and Spe = 71 (60, 80) on iPad. For NAIS: Sen = 80 (72,86) and Spe = 77 (67, 84) on iPhone; Sen = 75 (67, 82) and Spe = 80 (71, 87) on iPad. For HMCA: Sen = 53 (39, 67) and Spe = 97 (93, 99) on iPhone; Sen = 62 (48, 75) and Spe = 95 (91, 98) on iPad.
Conclusions: We believe this is the first study directly comparing the diagnostic accuracy of two different mobile devices for AIS on head CT. Both iPhone and iPad have fair sensitivity for detection of AIS and NAIS, but poorer sensitivity for HMCA when read by readers from different specialties. Specificity was good–excellent for all 3 CT findings. iPhone and iPad have similarly good diagnostic accuracy for AIS supporting their use for remote neuroimaging interpretation. Validation in clinical practice needs to be confirmed.

doi:10.1016/j.jns.2015.08.329

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WFN15-1036
Stroke 1
Comparative analysis of recanalization treatments in basilar artery occlusion

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Background: Basilar artery occlusion (BAO) is the most devastating form of stroke, and the current wisdom is to reverse it with aggressive revascularization treatments. Recent trials using endovascular stentrievers have shown efficacy in anterior circulation, but did not recruit posterior circulation occlusions. The preferred approach in BAO remains unknown.
Objective: This study collected published series of recanalization treatments in BAO to determine relative efficacy.
Patients and methods: We analyzed systematically the reported outcomes produced in 17 cohorts published from 2005 comprising 803 patients. Predictors of futile recanalization (FR; 3-month mRS score 4 to 6) were determined in the largest cohort (162, Helsinki).
Results: Superior results were achieved by primary thrombectomy with recanalization in 91% and good outcome (mRS 0 to 2) in 36%. Still, there was a substantial FR rate at 60%, which was improved using modern stentrievers only (52.8%). Good outcome was reported by mechanical approaches either alone or on-demand more frequently than by exclusively pharmacological protocols (35.5% vs. 24.4%, $p < 0.001$) in line with higher recanalization rates (84.1% vs. 70.9%, $p < 0.001$). In the largest single-center cohort, the most significant predictor was extensive baseline ischemia, increasing the odds of futility 20-fold (95% CI 4.4–92.3, $p < 0.001$). Ventilation support increased FR 7-fold (2.1–23.7, $p < 0.01$).
Conclusion: Modern stentriever approaches have reported superior outcome rates over exclusively pharmacological thrombolysis protocols in BAO. However, still more than half of the recanalizations turn out futile. To improve this, more careful patient selection is needed, especially to exclude patients with an already extended baseline ischemia.

doi:10.1016/j.jns.2015.08.330

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WFN15-1080
Stroke 1
PIAST — Platelet inhibition assessment in stroke trial multiplate analyzer based assessment of the efficacy of antithrombotic medication in stroke patients

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Objective: The aim of this prospective trial was to assess 1) the percentage of patients being treated with antiplatelet medications (AM) prior to or for secondary prevention of stroke who disclose an insufficient platelet aggregation (PA) inhibition assessed with Multiplate (MEA) — a validated platelet function test — and 2) conditions that might contribute to PA.
Background: A significant number of patients suffer from a recurrent cerebral ischemia despite treatment with AM without detectable progression of the underlying illness likely due to antiplatelet non-responsiveness caused by different factors. Platelet function was analyzed through MEA to identify the effects of antiplatelet therapy in stroke patients. Furthermore, the question if aspirin related insufficient platelet inhibition is correlated with the clinical diagnosis is addressed.
Methods: We analyzed the platelet function of 455 patients admitted with a suspected stroke either prior to being treated with aspirin and clopidogrel or being newly placed on AM employing MEA.
Results: Data shows that 120 (26.3%) of all examined patients with suspected ischemic stroke fall into the category of potential resistance to antiplatelet agents, mounting to 30% of the eventually confirmed 400 cerebral ischemia patients. Increased inflammatory biomarkers and use of NSAIDs was associated with an elevated PA and stroke/TIA incidence. Diabetes mellitus and decreased renal function do not seem to have an impact though. Insufficient PA seems to correlate with an increased rate of cerebral ischemia.
Conclusion: Nearly 1/3 of cerebral ischemia patients are potential aspirin nonresponders, which might have significant implications in the medical treatment of stroke patients.

I have obtained patient and/or Institutional Review Board (IRB) approval, as necessary

doi:10.1016/j.jns.2015.08.331